

**2016 Astrophysics Explorers
Medium Explorer (MIDEX) and Missions of Opportunity**

Concept Study Q&A

Change Log		
Rev.	Date	Description of Changes
01	09/11/2017	Added Q&A 1 and 2
02	10/05/2017	Added Q&A 3
03	10/06/2017	Added Q&A 4
04	10/25/17	Added Q&A 5
05	10/26/17	Added Q&A 6
06	10/31/17	Added Q&A 7, 8 and 9
07	11/2/17	Corrected Q&A 9
08	11/2/17	Added Q&A 10, 11, 12 and 13
09	11/28/2017	Added Q&A 14, 15 and 16
10	01/18/2018	Added Q&A 17
11	01/31/2018	Added Q&A 18 and 19, and updated Q&A 8
12	02/09/2018	Added Q&A 20, and updated Q&A 19
13	02/16/2018	Added Q&A 21
14	02/27/2018	Added Q&A 22
15	02/28/2018	Added Q&A 23
16	03/12/2018	Added Q&A 24
17	04/27/2018	Added Q&A 25
18	04/30/2018	Added Q&A 26, and updated Q&A 22
19	10/03/2018	Added Q&A 27

Q1 : What is the planning date for the end of Phase A?

A1 : For planning purposes, November 30, 2018 should be used as the end date for Phase A.

Q2 : When will the Site Visits occur?

A2 : Site Visits are expected to occur sometime during September and October 2018. The Program Scientist will contact PIs around January 2018 with closer approximations to the expected dates.

Q3 : Is there is some evidence that Aeroglaze Z306 can flake?

A3 : Yes, surface preparation is a key factor in the integrity of the coating. The referenced article provides guidelines and procedures for surface preparation and coating process. [McCroskey, D.M., Abell, G.C., Chidester, M.H., 2000. Aeroglaze Z306 black paint for cryogenic telescope use: outgassing and water vapor regain. In: Proceeding SPIE , vol. 4096, pp.119-128.]

Q4 : Do proposers of International Space Station (ISS) payloads need to fill out and provide the Proposer ISS Instrument Resource Accommodation Table and the Proposer Requested ISS Resource Table?

A4 : Yes, they need to be provided as separate files in the CD/DVD. These tables have been posted in Word format on the 2016 Astrophysics MO Program Library.

Q5 : Has the NASA Headquarters Point Of Contact (POC) for Space Communications and Space (SCaN) assets changed?

A5 : Yes, the new POC is John Hudiburg.
Phone: (202) 358- 9152
Email: john.j.hudiburg@nasa.gov

Q6 : Regarding Concept Study Guidelines and Criteria Requirement CS-45:

Provide quantitative risk assessments, where the probability and impact of occurrence are independently and numerically specified prior to mitigation; specification of probability and impact after mitigation is encouraged but not required. The products of pre-mitigation probabilities and impacts shall be included as encumbered cost reserves or explicitly identified in the basis of estimate, including cost validations.

May an impact be numerically specified in terms of a resource other than cost, such as performance margin?

A6 : Yes. The impact of a risk may be specified in terms of any resource that is quantified in the CSR. In fact, individual quantitative risk assessments may address multiple resources, as well as temporal increments (e.g., mitigation followed by post-mitigation). In order to determine the cumulative effect of risks on resources, each impact must be paired with a probability. The cumulative effect of the products of probabilities and impacts must not reduce the resource below that necessary to achieve baseline science.

Q7 : The PLF static envelope dimensions shown for Scenario 2 “assume co-manifest of a 24 inch ESPA ring” (Figure 6). We do not have information to model the ESPA ring with its attachments as part of our launch analyses. Therefore, please confirm that the listed launch vehicle performance for Scenario 2 (Table 2, Figures 3 and 4), as well as all the launch vehicle equivalent environments for Scenario 2 (Figures 8, 10, 12, 13) already account for that system, such as the capability and environments shown are for the PI-proposed flight system.

A7 : The launch performance stated for Scenario 2 does account for a rideshare option. The environments for Scenario 2 show the worse-case environments that can be seen on your spacecraft, which is the NO rideshare option.

Q8 : Page 7 lists “Scenario 2 PLF uses a 56.2 inch (1427 mm) separation system”. We are not familiar with a

standard separation system of 1427 mm diameter. Do you have any further information on that system?

A8 : The 56.2 inch (1427 mm) separation system reference was erroneously carried over from the original ELV Summary and is no longer applicable. Both Scenarios use the 47-inch (1194 mm) separation system. This information is reflected on page 7 in the updated ELV Launch Services Program Information Summary in the Program Library. *(revised 01/31/2018)*

Q9 : There is only one shock environment provided (Figure 7): is it the same for Scenario 1 and Scenario 2?

A9 : Yes, the shock environment is the same for both scenarios.

Q10 : In the paragraph preceding Factor B-8 on page 8 of the Guidance and Criteria for the Phase A Concept Study document mentions that Factor B-8 “will be evaluated for the CSRs in addition to the factors specified in Section 7.2.2 of the both the MDEX AO and the SALMON-2 AO...” These sections refer to the Science Merit evaluation factors. Should the paragraph refer to Section 7.2.3 instead?

A10 : Yes, references to “Section 7.2.2” in this paragraph should be replaced with “Section 7.2.3,” which corresponds to the Science Implementation Merit and Feasibility evaluation factors.

Q11 : Factor C-3 on page 9 of the Guidance and Criteria for the Phase A Concept Study document does not include the last sentence for C-3 in the SALMON-2 AO. Is this an oversight?

A11 : The baseline Factor C-3 was from the MDEX AO. In order to accommodate the MO CSRs, the following sentence should be added to the end of Factor C-3 in the above document: “This factor will be applied only to the extent that it is appropriate for the proposals solicited by the PEA.”

Q12 : Is a Mission Definition Requirements Agreement (MDRA) Example now provided in the Program Library?

A12 : Yes, an example is now posted in the Program Library.

Q13 : Does the Science Mission Directorate Class-D Spacecraft Risk Classifications Streamlining in the MO Program Library apply to the Class-D MO missions?

A13 : Yes, these reductions in the requirements for Class D missions apply to the 2016 Astrophysics Class-D MO missions.

Q14 : What are the limitations in terms of first-mode frequencies for the PI-proposed flight system, for the two Scenarios?

A14 : For scenario 1, the primary cantilevered bending modes are required to be above 8 Hz. There is no requirement for the primary axial mode.

For scenario 2, the primary cantilevered bending modes are required to be above 10 Hz, and the primary axial mode is required to be above 25 Hz.

Q15 : For the Atlas V, the ELVPERF website lists for the NLS-II contract “Performance values assume [...] 2 payload fairing doors.” Are the payload fairing (PLF) doors also available for Scenario 1 and Scenario 2 of this solicitation, and what are the constraints (if any) for the access door locations?

A15: Regarding scenarios 1 & 2. The Launch Vehicle Contractors (LVC) do offer the 1194 mm interface as a standard interface and do not currently offer not the 1427 mm. Regardless of the interface, co-manifested payloads and/or the addition of an ESPA ring the PLF door constraints are as follows:

Atlas V will provide 2 doors, the locations of the doors will be driven by the access requirements. There is some flexibility in placement of doors but access to the primary payload would take priority. If additional doors / access platform, etc., are required to accommodate co-manifested payloads there would be an additional cost.

For SpaceX Falcon 9, they will provide 2 doors, locations are set and they will provide platforms, etc., to reach the access points to accommodate all payloads. Depending on the number of access points there could be an additional cost.

Note that the cost for additional doors required by a co-manifested payload and/or the addition of an ESPA ring are outside the PI-Managed Mission Cost.

Q16 : Page 7 lists “Guidance reserves have been allocated to account for 3-sigma flight performance.” Should we take this to mean that margins to account for LV insertion errors are accounted for on the LV side and should not be part of the Spacecraft propellant budget? If part of the Spacecraft propellant budget, what launch vehicle insertion errors should we assume for each Scenario, given that we are launching into a high energy orbit?

A16 : The spacecraft propellant budget must include a margin for LV insertion errors.

For Scenario 1 High Energy, the customer should assume C3 dispersions between $\sim \pm 0.25 \text{ km}^2/\text{s}^2$ and $\sim \pm 0.5 \text{ km}^2/\text{s}^2$, depending on their payload mass (heavier is better for accuracy).

For Scenario 2 High Energy, the customer should assume C3 dispersion $\sim 0.1 \text{ km}^2/\text{s}^2$.

The Declination of Launch Asymptote (DLA) and Right ascension of Launch Asymptote (RLA) dispersion numbers are not available, but it's common to see requirements around 0.1 deg.

Q17 : Is there a size limit for the CSR? The guidelines don't indicate a size limit for the CSR and other required files.

A17 : There is no total limit except the capacity of the media (CD or DVD), but the PDF portion should not contain any more information than would have been in a printed version (i.e., no embedded animations, movies, etc; and graphics should not have a resolution higher than a normal printer could handle). The PDF files should be no larger than 60MB for ease of display. If necessary, a PDF file larger than 60MB can be divided into more than one file. Limits on number of pages, font sizes, and number of lines per page still apply to the CSR as stated in Requirement CS-4 and the table on page 14 of the CSR Guidelines and Criteria document, regardless of file size.

Q18 : For the small business subcontracting plans, please clarify the difference between Factor C-4 on page 10 of the CSR Guidelines document, and the additional factor, “Merit of the Small Business Subcontracting Plans” described on page 11 of the same document.

A18 : Factor C-4 focuses on the effect of the small business subcontracting plan (including small disadvantaged businesses) on the management approach and schedule. The additional factor on page 11 will focus on the small business subcontracting plans from a NASA Procurement standpoint, for example as stated in the factor description, “participation goals and quality and level of work performed by small business concerns overall, as well as that performed by the various categories of small business concerns listed in FAR 52.219-9, except for Small Disadvantaged Businesses (SDBs).”

Q19 : Are there any changes to the launch vehicle document in the Program Library?

A19 : Yes. An updated version of the ELV Launch Services Program Information Summary (Rev C) has been posted in the Program Library. The changes are

- Page 7, Performance Ground Rules: Removed Scenario 2 PLF separation system (see the response to question 8 above), and
- Page 8, Figure 6: Errors corrected and allowance for ESPA ring added in the PLF envelope. *(revised 02/07/2018)*

Q20 : What are the limitations on CG location for the PI-proposed flight system, above the interface plane defined in Figures 5 and 6 in the ELV Launch Services Program Information Summary?

A20 : Recommend CG limitation for:

- Scenario 1 to be < 5 m (196.85 inches) above the 1.194 m (47 inches) separation plane (bottom of the envelope)
- Scenario 2 to be < 2.39 m (94.48 inches) above recommended envelope bottom.

If the mass of the SC is anywhere near 5100 kg, LSP would need to assess the mass of the rest of the stack as a mission unique during the LSTO process.

Q21 : In regards to the upcoming (Feb 24th) deadline for a draft list of conflicted parties, I have a question about the format of the Excel file provided at:

[https://explorers.larc.nasa.gov/APMIDEX2016/MIDEX/xls_files/Conflicted_Party_List_\(Rev_10-05-17\).xlsx](https://explorers.larc.nasa.gov/APMIDEX2016/MIDEX/xls_files/Conflicted_Party_List_(Rev_10-05-17).xlsx)

In the 'Participating Individuals' tab, the instructions require “an estimate of the expected value of any project funding to be provided.” The Participating Individuals List table lacks a column for those entries. Is it desired that we insert a column for the value entries? If yes, then should we correct any subsequent errors that occur in the associated auto-generated table?

In the 'Participating Organizations' tab, the instructions omit the expected value of work performed by the organization. Yet there is a column for such entries. Are we to insert those dollar values? (The instructions for the Step-1 proposal did include the requirement for dollar value entries.)

A21 : There is no need to add a column to the “Participating Individuals” tab. The estimate of the expected value of any project funding to be provided for individuals may be entered into the “Notes/Comments as needed” column. If these values are not available before the due date of the draft list of conflicted parties, they may be omitted.

In the “Participating Organizations” tab, the last bullet in the instructions does ask for “the expected value of all work performed by the organization over the life of the project.” These values should be entered into the column provided, if available before the due date.

Q22 : Do we need to obtain a Letter of Support from the SCA N office to include in our Concept Study Report/Step-2 MIDEX proposal?

A22 : Yes. The last sentence of Requirement CS-75 in the CSR Guidelines and Criteria Document states “If the use of NASA-provided communication or navigation services is proposed, this appendix will include a letter of commitment,” referring to Appendix M1. Section 6 of the Mission Operations and Communications Services (MOCS) document states that “During the concept study phase (Phase-A or Step-2), as the mission’s concept is more clearly defined, a Letter of Commitment is generated or updated from Step 1.” A Letter of Commitment in Step 1 was required only if use of NASA’s network services beyond the capabilities described in the MOCS document was proposed.

The Mission Operations and Communications Services document is available in the Program Library. The Point of Contact for SCA N in the document has been updated, see Question 5. A new version of

the Mission Operations and Communications Services document is expected to be posted in the Program Library by the middle of March 2018 has been posted to the Program Libraries as follows (note this is the same document, posted to both program libraries):

MIDEX—https://explorers.larc.nasa.gov/APMIDEX2016/MIDEX/pdf_files/SCaN-MOCS-0001_Rev-1.pdf

Mission of Opportunity—https://explorers.larc.nasa.gov/APMIDEX2016/MO/pdf_files/SCaN-MOCS-0001_Rev-1.pdf

(Revised 04/30/2018)

Q23 : What's the number of the solicitation we respond to for the CSR? The CSR guidelines refer to a number that was used for the Draft AO.

A23 : The number that should be used is that of the Final AO, NNH16ZDA0100.

Q24 : Is there any additional guidance on tailoring for Class D missions?

A24 : Yes, in addition to the document referenced in Q13 above, there are Agency and Science Mission Directorate (SMD) documents that address Class D, including tailoring, at <https://soma.larc.nasa.gov/standardao/ClassD.html>. Page 2 in the CSR Guidelines and Criteria document lists a Point of Contact for proposed tailoring approaches.

Q25 : The CSR Guidelines and Criteria document states that concept study teams should contact Greg Robinson regarding tailoring of 7120.5E. Is Greg still the correct contact, given the recent NASA Senior Leadership changes? If not, with whom should discussions be held, and who should provide the associated letter of concurrence?

A25 : Concept study teams should contact Sandra Connelly at (202) 358-4731 or sandra.connelly@nasa.gov to discuss proposed tailoring approaches and the associated letter of concurrence.

Q26 : We have determined that we will need CPU hours from the NASA High-End Computing (HEC) resources. Will we need a letter of support stating that these resources would be available in case we are selected?

A26 : SMD makes NASA HEC available to investigators for peer-reviewed NASA-funded science projects, including Explorers. In your CSR, state your: 1) requirements, by year, for computing in the “standard billing units” (SBUs); 2) data storage need in Terabytes, by year; 3) explanation of the need to use this capability. You do not need to submit a letter of support. The general HEC webpage is at <https://hec.gsfc.nasa.gov/index.html>, and SBU Conversion Factors may be found at <https://www.hec.nasa.gov/user/policies/sbus.html>. Costs associated with HEC utilization will not count against the PI-Managed Mission Costs.

Q27 : What has changed in the updated Evaluation Plan posted on 10/03/2018?

A27 : On the last page (pg 46), the invited observers section was updated with an additional observer to the CASE Site Visit and the Final TMC Plenary, Dr. Eric Tollestrup of NASA HQ.